

## Prediction Model of Acrylamide Content in Fried Potato Chips Based on Chromaticity



Acrylamide is classified as group 2A "possible human carcinogens" by the International Agency for Research on Cancer [1]. According to the data provided by the Institute of Nutrition and Food Safety, China Center for Disease Control and Prevention, the content of acrylamide in fried potatoes is the highest among more than 100 samples. Therefore, it is necessary to study the content of acrylamide in fried potato chips in order to provide scientific basis for the safe processing and eating of fried potato chips. [French fries snack processing line](#)

At present, the commonly used analytical methods for the determination of acrylamide content, such as high performance liquid chromatography and gas chromatography-mass spectrometry

(GC-MS), belong to the destructive detection [3]. [Microwave sterilization machinery and equipment](#)

The detection process is complex and time-consuming, and requires high-end and precise scientific instruments. The color difference meter, which has been widely used in meat freshness judgment and fruit and vegetable maturity detection, has the advantages of simple operation and low detection cost [4-6]. This study intends to establish a relationship model between color change and acrylamide content, and explore a rapid method for predicting acrylamide content in French fries.

1 materials and methods 1.1 materials and reagents Kexin No. 1 Potatoes: Hulun Bell Hesheng Potato Industry Development Co., Ltd; Palm Oil: Tianjin Julong Grain and Oil Co., Ltd; Soybean Oil: Jiali Grain and Oil Co., Ltd. (Yingkou); Sunflower Oil: Inner Mongolia Luhua Sunflower Oil Co., Ltd; Harmonized Oil: Jiali Grain and Oil Co., Ltd. (Yingkou). The reagents used were all analytical pure. 1.2 instruments and equipment Ultra Scan PRO: HunterLab Company, USA; Chromatograph (Agilent 1200): Agilent Technology (Shanghai) Co., Ltd; Single Cylinder and Single Sieve Fried Pot (SZ-6): Foshan Spot Electrical Appliances Co., Ltd; Rotary Evaporator (RE-52AA): Shanghai Yarong Biochemical Instrument Factory. 1.3 test method

1.3.1 Sample preparation process Potato peeling slicing color protection hot blanching cooling and drying 1 cm in thickness 2.0% NaCl, 30 min (90 C blast drying for 30 min) frying oil leaching finished products preservation 1.3.2 Acrylamide extraction and detection refer to references [7] and [8]. Determination of 1.3.3 chromaticity The chromaticity change of French fries was detected by chromatometer. 1.3.4 data analysis SPSS 22.0 software was used to analyze the data. 2 results and discussion 2.1 Changes in the chroma of French fries during frying

The potato variety is Kexin No. 1 and the oil variety is palm oil. The chroma of fried potatoes was measured at 3, 4, 5, 6, 7, 8 and 9 minutes respectively. The chroma of fried potatoes was linearly fitted with the chroma of fried potatoes.

The three values of  $L^*$ ,  $a^*$  and  $b^*$  are commonly used to quantify the color of the sample. The value of  $L^*$  represents the brightness of the sample. The value ranges from 0 to 100 (from black to white), the value of  $a^*$  represents the red degree of the sample, and the value ranges from -60 to 60 (from green to red), and the value of  $b^*$  represents the Yellow degree of the sample, ranging from -60 to 60 (from green to red). Blue to yellow. As can be seen from Figure 1, the  $L^*$  value,  $a^*$  value of frying time in the range of 3 to 9 minutes.

The  $b^*$  value has a good linear relationship with frying time. Among them, the linear correlation between  $a^*$  value and frying time is the best.